Lowering the Cost of Continuous Streamflow Monitoring

When: Planned Launch Fall 2017

Problem Statement: Water resources planning, management, and research rely on accurate and reliable records from continuous streamflow monitoring (or gaging) stations. Long-term streamflow records, for example, are the basis for evaluating water supply reliability and flood risk for the design of water supply and flood control projects, as well as other riparian and instream infrastructure. Similarly, real-time streamflow data support water supply and flood control operations, including forecast and early warning systems for droughts and floods. Long-term and real-time streamflow data also support a broad range of water resources and environmental research.

Despite the critical importance of continuous streamflow monitoring, the network of continuous monitoring stations in the United States has generally declined over the past several decades. The number of active USGS stream gages peaked in the late 1960s and declined by nearly 20% by the late 1990s. The primary driver of this decline is the cost associated with installing, operating, and maintaining streamflow monitoring stations. Between 2000 and 2009, additional funding was made available to reactivate approximately half of the deactivated gages; however, the cost of installing, operating, and maintaining streamflow monitoring stations remains a significant challenge to Federal, Tribal, State, and local water agencies.

This Prize Competition seeks new and innovative methods to significantly reduce cost of continuous streamflow monitoring compared to current methods, including new methods or technologies that reduce the equipment costs and/or labor costs of streamflow monitoring. Methods must be applicable to continuous monitoring of the volumetric flow rate of water in open channels, including natural channels (e.g., streams and rivers) and engineered channels (e.g., aqueducts, canals, and drainage channels). Methods should be applicable across wide range of flow rates, channel sizes, and channel geometries, and the accuracy and reliability of methods should be comparable or better than commonly used stage-discharge methods.

Potential Impacts of a Successful Solution: A successful solution to this Prize Competition will significantly reduce the cost of continuous streamflow monitoring and increase the availability of streamflow data that is vital to the effective planning, design, and operation of water resources projects.

Prize Competition Scope: This prize competition is envisioned to consist of three stages. The decision to proceed to Stage 2 will depend on the results of Stage 1, as well as other considerations.

- **Stage 1** is a theoretical challenge requiring a white paper submittal detailing the proposed monitoring approach, including its theoretical basis and estimated cost of initial installation and long-term operation and maintenance. Stage 1 will have a total prize purse of $75,000.
- **Stage 2** is envisioned as a lab-scale reduction-to-practice challenge requiring development of a prototype monitoring station and demonstration in a laboratory setting (e.g., in a hydraulics laboratory) over a period of one to three days. Stage 2 is anticipated to have a total prize purse of $150,000.
- **Stage 3** is envisioned as a field-scale reduction-to-practice challenge requiring demonstration in a field setting (e.g., in one or more river locations) over a period of one week to one month. Stage 3 is anticipated to have a total prize purse of $300,000.

Reclamation may invite non-Federal water agencies, industry, non-profit organizations, and venture capital representatives to participate as partners and/or judges of this competition and/or to seek potential business deals with competition participants to commercialize successful solutions.

Collaborators:

RECLAMATION Managing Water in the West

USGS science for a changing world